ASSIGNMENT 1

Textbook Assignment "Basic Automotive Electricity" and "Automotive Electrical Circuits and Wiring," chapters 1 and 2, pages 1-1 through 2-40.

1-1. All matter is made up of tiny particles. These particles are known by what term?

1. Protons
2. Electrons
3. Neutrons
4. Atoms

1-2. A group of electrons produce what type of electrical charge?

1. Positive
2. Negative
3. Neutral
4. Ionized

1-3. Electrical energy is transferred through conductors by what means?

1. The movement of free electrons
2. The movement of free protons
3. The movement of free neutrons
4. The movement of free quarks

1-4. In a semiconductor, what type of material is doped to yield free electrons?

1. O-type
2. P-type
3. N-type
4. Y-type

1-5. What type of electrical device is used in electrical circuits to control the flow of current and operates by either allowing or not allowing current to flow?

1. Transistor
2. Diode
3. Resistor
4. Thermistor

1-6. What transistor design is the most often used in automotive applications?

1. PPN
2. NNP
3. PNP
4. NPN

1-7. In an electrical circuit, current (or electron) flow is measured in amps and is known as

1. voltage
2. amperage
3. resistance
4. ohms

1-8. Using Ohm's law, what is the amperage in a circuit if the voltage is 13.8 and resistance is 2.25 ohms?

1. 3.16
2. 3.61
3. 5.10
4. 6.13

1-9. What type of automotive circuit allows the disconnection or burning out of any individual component without affecting the operation of the others?

1. Series-parallel
2. Parallel-series
3. Series
4. Parallel

1-10. To have a series-parallel circuit, you must have what minimum number of resistance units?

1. One
2. Two
3. Three
4. Four

1-11. What type of circuit failure occurs when the resistance in the wiring circuit is such that current can NOT flow between the battery and the unit it operates?

1. Short circuit
2. Open circuit
3. Ground circuit
4. Dead circuit

1-12. When the direction of current flow is known, what rule can be used to determine the north pole of an electromagnet?

1. Right-hand
2. Left-hand
3. Lines-of-force
4. Ohm's

1-13. How is electromagnetic induction produced in an ac generator?

1. The wire is moved through a stationary magnetic field
2. The wire is stationary and the magnet is moved so the magnetic field is carried past the wire
3. The wire and electromagnet are both held stationary and current is turned on and off
4. Both the wire and electromagnet are moved, thereby alternating the magnetic field

1-14. What are the names of the five automotive electrical circuits?

1. Charging, starting, ignition, lighting, and accessory
2. Starting, lighting, accessory, charging, and cranking
3. Lighting, battery, power generation, accessory, and starting
4. Ignition, power generation, charging, starting, and accessory

1-15. In a lead-acid battery, current is produced by what type of reaction?

1. Photochemical
2. Chemical
3. Photoelectric
4. Electronic

1-16. A 12-volt lead-acid, automotive battery consists of how many elements that are connected in series?

1. Six
2. Two
3. Three
4. Four

1-17. The positive plates in a charged lead-acid battery contain what chemical compound?

1. Lead phosphate
2. Lead sulfate
3. Lead chromate
4. Lead peroxide

1-18. Why are the cell elements of a storage battery elevated inside the case?

1. To allow the electrolyte to circulate under the elements
2. To prevent the elements from shorting against the case
3. To reduce the amount of lead required for connecting the elements and terminal posts
4. To prevent shorting of the elements when material from the plates settles to the bottom of the case

1-19. When the temperature is 80°F, a fully charged lead-acid battery will produce what specific gravity reading?

1. 1.28
2. 1.82
3. 2.18
4. 2.81

1-20. When taking a hydrometer reading of a battery whose temperature is 100°F, you must make what modification to the reading to determine the actual specific gravity of the electrolyte?

1. Add 0.006
2. Add 0.008
3. Add 0.003
4. Add 0.004

1-21. The capacity of a battery cell is NOT affected by which of the following factors?

1. The area of the plates in contact with the electrolyte and the quantity and specific gravity of the electrolyte
2. The type of separators and the final limiting voltage
3. The general condition of the battery (degree of sulfating, plates buckled, separators warped, sediment in the bottom of the cells, etc.)
4. The number of elements connected in parallel

1-22. What are the two methods for rating lead-acid storage batteries?

1. Reserve capacity rating and discharge rating
2. Reserve capacity rating and ampere-hour rating
3. Cold-cranking rating and reserve capacity rating
4. Cold-cranking rating and discharge rating

1-23. In battery charging, either the current or voltage is kept constant.

1. True
2. False

1-24. When charging a 19-plate battery by the constant-current method, you should use what charging rate?

1. 9 amp
2. 10 amp
3. 19 amp
4. 20 amp

1-25. Which of the following factors produces the value of the charging current in a constant voltage battery charger?

1. The battery increasingly resists current as its own charge builds
2. A clock-actuated rheostat adjusts the current value
3. A rectifier tube automatically adjusts the current value
4. The operator changes plug-in positions to lower the charger output at half-hour intervals

1-26. You are about to connect a battery to a charger when you notice that the terminal markings on the battery post are not readable. To ensure correct battery-to-charger connections, you should take what action?

1. Check the battery with an ammeter to determine the positive post
2. Connect the larger battery post to the unmarked charger terminal
3. Energize the charger and observe the reading on the charger gauge as you touch the battery cables to the charger
4. Connect the larger battery post to the marked charger terminal

1-27. When charging batteries, you should take which of the following actions?

1. Add electrolyte to any cell in which the fluid level is below the top of the plates before charging
2. Remove the vent plugs to prevent an accumulation of gases
3. Take frequent hydrometer readings to determine if the battery is functioning properly during charging
4. Remove each battery for a 10-minute break when half charged

1-28. What should you do with a new 12-volt battery that registers only 9 volts on a voltmeter?

1. Add electrolyte
2. Recharge it
3. Discard it
4. Place it in service to see whether its voltage will increase or decrease

1-29. What procedure is considered the only safe way to mix electrolyte for a lead-acid battery?

1. Pour water into acid slowly and stir gently
2. Pour water into acid slowly and stir vigorously
3. Pour acid into water slowly and stir gently
4. Pour acid into water slowly and stir vigorously

1-30. When cleaning the top of a lead-acid battery, you should use a

1. soft bristle brush and a mixture of water and baking soda
2. soft bristle brush and a mixture of water and muratic acid
3. stiff bristle brush and a mixture of water and baking soda
4. stiff bristle brush and a mixture of water and muratic acid

1-31. What test allows you to determine the general condition of a maintenance-free battery?

1. Cell voltage
2. Battery leakage
3. Battery drain
4. Battery voltage

1-32. When load testing a battery with a cold-cranking rating of 350 amps, you should load the battery to what total number of amps?

1. 150
2. 175
3. 200
4. 225

1-33. The generator converts mechanical energy into electrical energy and restores the battery with the energy it expends.

1. True
2. False

1-34. The current generated by an alternator is converted to direct current by means of what component?

1. Armature coil
2. Condenser
3. Rectifier
4. Station field coil

1-35. The alternating current in the armature coil of a dc generator is changed to direct current in the external circuit by what component?

1. Armature
2. Commutator
3. Changes in the polarity of the field
4. Slip rings

1-36. The output of a dc generator is NOT determined by which of the following factors?

1. The speed of the armature rotation
2. The number of armature conductors
3. The strength of the magnetic field
4. The weakness of the ions

1-37. The current regulator functions to protect the electrical system by

1. limiting battery output
2. limiting generator output
3. disconnecting the electrical system
4. increasing resistance at the generator

1-38. What condition causes solder globules to form inside the cover band of a generator?

1. Excessive current output
2. Open field circuit
3. Excessively worn brushes
4. Internally shorted armature

1-39. A test lamp lights with normal brilliance when it is connected to the field lead terminal of a generator. What condition does this indicate?

1. An open field
2. A normal field
3. A shorted field
4. A grounded field

1-40. When a milliammeter reading near zero is obtained across a pair of commutator segments on an armature that is mounted in a growler, the coil is

1. open
2. shorted
3. normal
4. grounded

1-41. What component of an alternator is mounted on the rotor shaft and provides current to the rotor windings?

1. Slip rings
2. Claw poles
3. Stator core
4. Coils

1-42. In what manner are stator windings connected in an alternator?

1. One end is connected to the positive diodes and the other end to the negative diodes
2. One end is connected to the stator assembly and the other end to the rectifier assembly
3. One end is connected to the negative diodes and the other end to the field windings
4. One end is connected to the electrical terminals and the other end to the rotor shaft

1-43. What type of stator will provide good current output at low engine speeds?

1. Delta-type
2. Omega-type
3. K-type
4. Y-type

1-44. A total of how many diodes are grounded in an alternator?

1. One
2. Two
3. Three
4. Four

1-45. Grounding the field terminal of the alternator will result in damage to the

1. regulator
2. diodes
3. rotor windings
4. alternator

1-46. A charging system containing an alternator can be checked for proper operation by means of a/an

1. ammeter
2. voltmeter
3. screwdriver
4. jumper wire

1-47. To determine if an alternator rotor is internally shorted, you can test the rotor windings with what device?

1. Armature growler
2. Galvanometer
3. Test lamp
4. Ohmmeter

1-48. Testing of an alternator stator is limited to

1. shorts and opens
2. opens and grounds
3. grounds and continuity
4. continuity and shorts

1-49. Which of the following charging system tests allow you to measure the charging system voltage under low output, low load conditions?

1. Regulator bypass
2. Charging system output
3. Regulator voltage
4. Charging system bypass

1-50. When performing a regulator bypass test, you should use which of the following methods to bypass the voltage regulator?

1. Place a jumper wire from the field terminals of the alternator to the engine block
2. Place a jumper wire from the test tab to the field terminals of the alternator
3. Place a jumper wire across the battery and field terminals of the alternator
4. Unplug the wire from the regulator

1-51. What mechanism relies on the principle of inertial force to make the drive pinion mesh with the flywheel?

1. The Bendix drive
2. The overruning clutch
3. The Dyer drive
4. The reduction drive

1-52. In a starting circuit containing a solenoid, when is battery current supplied to the starter motor?

1. When the remote control switch is closed
2. At the time the ignition switch is turned to the start position
3. After the starter pinion is engaged with the flywheel
4. When the plunger closes the contacts in the solenoid

1-53. Continued starter operation after releasing the starter button or ignition key is often caused by

1. a broken Bendix spring
2. a worn solenoid plunger
3. shorted solenoid windings
4. a faulty pinion and rotor assembly

1-54. Field windings vary according to application. What is the most popular configuration used to provide a large amount of low-speed torque?

1. Six windings, series-parallel
2. Two windings, parallel
3. Three windings, series-parallel
4. Four windings, series

1-55. Which of the following starting circuit components is common to all vehicles and equipment having automatic transmissions?

1. Starter solenoid
2. Relay
3. Neutral safety switch
4. Double reduction starter

1-56. When it is necessary to adjust a neutral safety switch, which of the following test equipment is required?

1. Voltmeter
2. Ohmmeter
3. Inductive ammeter
4. Test light

1-57. When inspecting a disassembled starter, you should replace the brushes if they are less than

1. one half of their original size
2. one third of their original size
3. one fourth of their original size
4. one eighth of their original size

1-58. To determine the operating condition of the starter circuit, you should use which of the following tests to measure the amount of amperage used by the circuit?

1. Starter circuit resistance
2. Starter circuit voltage drop
3. Stator current draw
4. Starter ground

1-59. The battery-ignition circuit consists of a total of how many circuits?

1. One
2. Two
3. Three
4. Four

1-60. Which component in the ignition circuit provides high voltage in the secondary circuit?

1. Ignition distributor
2. Ballast resistor
3. Battery
4. Ignition coil

1-61. In an ignition circuit, high voltage is directed to the spark plugs in the correct firing order by what component?

1. Ballast resistor
2. Ignition coil
3. Distributor rotor
4. Spark plug wires

1-62. Which of the following actions is NOT a function of the distributor in the ignition circuit?

1. Actuate the ON/OFF cycles of current flow through the primary windings of the coil
2. Distribute the high voltage surges of the coil to the spark plugs
3. Change spark timing with changes in engine load
4. Deactivate the thermostat

1-63. A nonresistor type spark plug is designed to reduce static in the radio in a vehicle.

1. True
2. False

1-64. When troubleshooting an ignition circuit, you should change the manufacturer's specified heat range of the spark plugs when what condition exists?

1. Increased resistance is required by the circuit
2. Abnormal operating conditions are encountered
3. Ignition timing is changed from the manufacturer’s setting
4. High voltage surges in the primary circuit are reduced

1-65. A function of the condenser in a contact-point ignition system is to

1. stop the flow of the magnetic lines of flux when the points open
2. regulate the flow of current through the secondary winding
3. allow for a rapid collapse of the magnetic field around the primary winding
4. prevent arcing at the points when they are first opened

1-66. The distributor contact points and cam provide a means of opening and closing the primary circuit.

1. True
2. False

1-67. The amount of time that the points remain closed between openings, given in degrees of distributor rotation, is known as

1. point timing
2. point dwell
3. point angle
4. point arcing

1-68. What component opens and closes the primary circuit of an electronic ignition system?

1. Electronic module control (EMC)
2. Electronic primary control (EPC)
3. Electronic circuit control (ECC)
4. Electronic control unit (ECU)

1-69. An electronic ignition system is equipped with a Hall effect sensor. In this system there are the same number of shutters as there are

1. transistors
2. diodes
3. engine cylinders
4. cam lobes

1-70. What timing advance mechanism provides additional spark when the engine load is low and at part throttle?

1. Vacuum
2. Centrifugal
3. Transistorized
4. Electronic

1-71. In a computerized timing advance mechanism, what sensor reports piston position to the computer?

1. Crankshaft
2. Camshaft
3. Throttle
4. Height

1-72. A grayish tan deposit on the insulator of a spark plug indicates what condition exists?

1. Normal operation
2. Carbon fouled
3. Ash fouled
4. Preignition damage

1-73. How often should spark plugs be regapped?

1. Each time the vehicle is serviced
2. At 6,000 mile intervals
3. Any time they are removed for inspection
4. During a "B" PM only

1-74. Some manufacturers specify spark plug torque, while others recommend bottoming the plugs on the seat and then turning an additional one-quarter to one-third turn.

1. True
2. False

1-75. You have performed a spark plug wire resistance test. The test should not show the resistance to be over 5,000 ohms per inch or what total number of ohms?

1. 25,000
2. 50,000
3. 100,000
4. 125,000